*" Finding desperately needed answers to many important questions in EMS is hopeless without the development of new ways to collect, link, and analyze valid, meaningful information. This is the very foundation of the future of EMS!"*
Daniel W. Spaite, MD
EMS Agenda for the Future
National Highway Traffic Safety Administration

# RECOMMENDATIONS FOR A STATEWIDE EMS INFORMATION SYSTEM VISION SUBCOMMITTEE #3

## *Goal:*

The goal of a Statewide Integrated Information System is to acquire, process, and disseminate information to all necessary stakeholders in order to evaluate and improve the delivery of emergency medical care. This will serve as the foundation for operational and strategic decisions in all aspects of EMS system design and function. "The lack of organized information systems that produce data which are valid, reliable, and accurate is a significant barrier to coordinating EMS system evaluation..." *EMS Agenda for the Future.*

## *Findings:*

**A.** The existing Statewide EMS Aggregate Database is not adequate to serve the information needs of the EMS community. The Emergency Medical Services Authority (EMSA) currently possesses no requirement or capability for Local EMS Agencies (LEMSAs) to transmit and store data related to individual patient contacts. The existing requirement for data submission to the EMSA consists of a set of seven reports that have been included in the current EMSA regulations. The reports are voluntary, submitted quarterly, and often internally inconsistent. The mechanism for transmitting that data is paper, and the repository for the storage of that data is a rudimentary data file. This system does not provide meaningful information for the evaluation of quality EMS services.

**B.** The status of all 50 states was determined, and although some have one or more desirable component in place, none have information systems that meet all of the requirements listed below.

**C.** The State Data Conference on Report Generation and Quality Indicators set forth the following recommendations to the EMS Authority pertaining to a statewide information system:

1. Convene and fund a Data Task Force
2. Revise the statewide data collection and report generation system

3. Promote the use of existing standard EMS system evaluation tools
4. Developed linkages across the entire EMS system
5. Provide technical assistance
6. Prepare a Statewide Data System Plan
7. Use "questions to be answered" to determine data collection

## *Background:*

A Statewide Integrated Information System should include all of the issues and components listed below:

### A. Customers:

To be as useful as possible, an information system must be designed to meet the needs of all users. The users include the current set of internal and external customers of the EMS system – EMS personnel, provider agencies, the medical community, local EMS agencies, patients, third party payers, governmental agencies which fund EMS, allied health care organizations, labor organizations, and research centers. When a functional information system is in place, the set of customers will expand to include more outside agencies.

### B. Reports:

To convert data into useful information to assist the various strategic planning and operational activities of the stakeholders, the system must be designed with the end product in mind - to produce useful reports. Many systems have failed because, after substantial cost and effort, the data collected and processed resulted in reports that were of limited or no use. Decisions must be made based upon the usefulness and appropriateness of the information rather than simply the ease of the data collection mechanism. The Statewide EMS System Evaluation Grant Project will prepare a template for reports that will evaluate EMS system performance. Examples of reports are as follows:

1. Patient outcome by chief complaint of "shortness of breath" by hospital ICD-9 code, treatment, response intervals, and accuracy of field diagnosis.
2. Statewide analysis of patient outcomes after use of infrequently attempted procedures, such as needle crichothyrotomy.
3. Cardiac arrest survival rates and neurological outcomes as they relate to response intervals and treatment.
4. Patient outcome after vehicle collision by type of vehicle, distance to hospital, severity of injury, type and location of collision, field treatment, and hospital treatment.

### C. Data Set:

A set of data elements along with detailed and specific definitions must be prepared. Models have been published, such as the *California EMS Data System Standards*, the *NHTSA Prehospital EMS Data Conference Final Report*, and the *Data Elements for Emergency Department Systems*. They should also conform, where appropriate, to national standard specifications, such as Health Level 7 (HL7), a widely used protocol for

electronic data exchange, and ASTM's E1238-94: Standard Specification for Transferring Clinical Observation Between Independent Computer Systems.

**D. Coordination:**
The content of, and procedures for, collecting prehospital emergency medical data must be coordinated with other data collection programs such as hospital emergency department, inpatient and outpatient data as well as vital statistics data and data from other agencies such as county coroners. Inefficiency, redundancy and duplication must be avoided.

**E. Client Identification:**
Prehospital emergency medical data must include a unique patient identifier for use in linking data. The identifier must include multiple elements, such as those employed in the Common Patient Identifier used by the UCSF Family Health Outcomes Project and State Department of Health Services. No single element (e.g., Social Security Number) is sufficient to accurately identify all patients and allow linkages with outside databases.

**F. Confidentiality and Security:**
All prehospital emergency medical data systems must operate under an overriding policy of protecting personal information and maintaining confidentiality. The policy must ensure that personal information: (1) be acquired, disclosed, and used only in ways that respect an individual's privacy, (2) not be improperly altered or destroyed, and (3) be accurate, timely, complete, and relevant for the purpose for which it is provided and used.

**G. Data Entry:**
Mechanisms must be in place to assure the accurate acquisition of necessary data as close to the time of delivery of care as possible. Numerous examples are in use, and the technology is changing rapidly. Examples are: OCR/OMR scanning, keyboard and touch screen computer entry, and personal digital assistants (PDAs). Data will be obtained from the primary source whenever possible, and should not be transferred to second and third parties before entry into the system. Regardless of the process of data entry, the data must be accurately and reliably converted to standardized format for use in the Statewide EMS Information System.

**H. Transmission and Statewide Repository:**
An EMS Information System should be able to obtain data from the EMS providers (typically through the LEMSAs), validate the data and link with other EMS systems. The data can then be processed, formatted, and made available to the customers as appropriate. Collection, storage, and transmission of data must meet all regulatory requirements. HCFA is scheduled to adopt regulations which may impact EMS practices in the transmission of data at the state level.

**I. Database Linkage:**
Internal linkage of EMS system data, using one-to-one or deterministic methods, is essential to describe the continuum of pre hospital care, system evaluation, and outcome research.

One of the important features of the Statewide Integrated Information System envisioned is its ability to potentially be linked to external databases, making it possible to do, in part, the following:

1. Describe intermediate and long term outcome in pre hospital populations
2. Evaluate the effectiveness of EMS care in specific populations
3. Perform cost effectiveness studies
4. Evaluate programs and policies
5. Support or evaluate legislation impacting populations impacted by an EMS system
6. Define target populations or groups at risk, in order to plan interventions

Examples of external data sources that could be used to achieve the above are:

1. Hospital discharge data
2. Trauma registries
3. Intensive Care Unit (ICU) database - Statewide
4. Statewide Integrated Traffic Records System
5. Poison Control Center data
6. Death Certificates- statewide death file
7. Worker's Compensation
8. Immunization registries
9. DAWN (drug abuse warning network) data
10. Uniform Crime Reports (firearms-related data)- local, state
11. HMO, other health insurance databases

**J. Dissemination:**

Various internal and external customers will have uses for the information. Level of access, methods of security and method and time of transmission must be determined by all involved stakeholders. The data that contains confidential information must be stored in an appropriate data repository that is not externally available. Data that has been processed, and from which confidential elements have been removed, will be made available.

**K. Funding:**

The development and implementation of a statewide information system will be a costly and complex endeavor. Critical to its success is identifying and securing adequate funding. This will likely involve a combination of national, state and local EMS organizations as well as outside sources. Examples of outside funding sources are:

1. Telecommunications and Information Infrastructure Assistance Program (TIIAP)
2. The California Endowment
3. DOT NHTSA Crash Outcome Data Evaluation Systems
4. The Robert Wood Johnson Foundation
5. Southwestern Bell Communications Foundation (Pacific Bell Communications)

## *Implementation:*

We recommend the following steps be taken:

**A.** A Statewide EMS Information System committee, including sufficient paid staff and appropriate domain experts, must be established.

**B.** An outline of the scope of the project should be prepared and distributed to all of the identified customers. Using this input, an EMS Information System Plan can be prepared. This plan must include all of the elements listed above, as well as a list of priority components and a proposed timeline.

**C.** The EMS Information System Plan should be presented to the Commission on Emergency Medical Services for endorsement and appropriate action.

**D.** An EMS Information System Home Page, probably on the EMSA site, should be established. This will include sufficient staff support to review and update it at least twice weekly, and may include an area for questions/answers and discussion. It will be linked to sources of EMS and other information system sites.